

Claims

1           1.       (Currently Amended) A method for recovering from a failure in a  
2 network, comprising:  
3           sending a first set of information from a source to a destination via a first route;  
4           detecting a failure along said first route;  
5           in response to said failure, directing a message to said source informing said  
6 source of said failure; and  
7           in response to said message, sending a future set of information from said source  
8 to said destination via an alternate route;  
9           wherein directing said message to said source comprises:  
10           identifying said source;  
11           accessing a routing table which comprises one or more routes to said  
12           source;  
13           obtaining a return route from said routing table, wherein said return route  
14           is different from said first route; and  
15           sending said message to said source via said return route.

1           2.       (Original) The method of claim 1, further comprising:  
2           in response to said message, preventing other sets of information from being sent  
3 from said source to said destination via said first route.

1           3.       (Original) The method of claim 1, where said first set of information  
2 comprises a data portion, and wherein said method further comprises:

3           in response to said message, resending at least said data portion of said first set of  
4   information from said source to said destination via said alternate route.

1           4.     (Original) The method of claim 3, wherein said message comprises said  
2   data portion such that said data portion is returned to said source.

1           5-6    Canceled

1           7.     (Previously Presented) The method of claim 1, wherein identifying said  
2   source comprises:  
3           extracting from said first set of information an identifier which identifies said  
4   source.

1           8.     Canceled

1           9.     (Original) The method of claim 1, wherein said method is implemented  
2   on a routing layer of said network.

1           10.    (Original) The method of claim 1, wherein said method is implemented  
2   within a router of said network.

1           11.    (Currently Amended) A method, implemented within a router of a  
2   network, for recovering from a failure, comprising:

3            sending a first set of information from an ingress module to an egress module via  
 4   a first route;  
 5            detecting a failure in said first route;  
 6            in response to said failure, directing a message to said ingress module informing  
 7   said ingress module of said failure; and  
 8            in response to said message, sending a future set of information from said ingress  
 9   module to said egress module via an alternate route;  
 10          wherein directing said message to said ingress module comprises:  
 11                  identifying said ingress module;  
 12                  accessing a routing table which comprises one or more routes to said  
 13                  ingress module;  
 14                  obtaining a return route from said routing table, wherein said return route  
 15                  is different from said first route; and  
 16                  sending said message to said ingress module via said return route.

1            12.    (Previously Presented) The method of claim 11, wherein said first route  
 2   and said alternate route are predetermined and stored within a second routing table.

1            13.    (Previously Presented) The method of claim 12, wherein sending said  
 2   future set of information comprises:  
 3            selecting said alternate route from said second routing table.

1            14.    (Original) The method of claim 11, further comprising:

2 in response to said message, preventing other sets of information from being sent  
3 from said ingress module to said egress module via said first route.

1 15. (Previously Presented) The method of claim 14, wherein said first route  
2 and said alternate route are predetermined and stored within a second routing table, and  
3 wherein preventing comprises:  
4 replacing said first route with said alternate route in said second routing table.

1 16. (Previously Presented) The method of claim 11, wherein said first set of  
2 information comprises a data portion, and wherein said method further comprises:  
3 in response to said message, resending at least said data portion of said first set of  
4 information from said ingress module to said egress module via said alternate route for  
5 forwarding to a destination.

1 17. (Original) The method of claim 16, wherein said message comprises said  
2 data portion such that said data portion is returned to said ingress module.

1 18. Canceled

1 19. (Previously Presented) The method of claim 11, wherein identifying said  
2 ingress module comprises:  
3 extracting from said first set of information an identifier which identifies said  
4 ingress module.

1           20.     (Original) The method of claim 11, wherein said ingress module  
2 comprises an ingress line card, and said egress module comprises an egress line card.

1           21.     (Currently Amended) A method, implemented within a router of a  
2 network, for recovering from a failure, comprising:  
3           sending, via a first route, a first set of information from an ingress module to a  
4 first egress module for forwarding by said first egress module to a destination external to  
5 said router;  
6           detecting a failure of said first egress module;  
7           in response to said failure of said first egress module, directing a message to said  
8 ingress module informing said ingress module of said first egress module failure;  
9           in response to said message, selecting an alternate egress module capable of  
10 forwarding information to said destination; and  
11           sending, via a second route, a future set of information from said ingress module  
12 to said alternate egress module for forwarding to said destination;  
13           wherein directing said message to said ingress module comprises:  
14                 identifying said ingress module;  
15                 accessing a routing table which comprises one or more routes to said  
16                         ingress module;  
17                 obtaining a return route from said routing table, wherein said return route  
18                         is different from said first route; and  
19                 sending said message to said ingress module via said return route.

1           22.     (Original) The method of claim 21, wherein said first set of information  
2     and said future set of information are both part of a flow, and wherein said method  
3     further comprises:  
4           in response to said message, preventing other sets of information associated with  
5     said flow from being sent from said ingress module to said first egress module.

1           23.     (Original) The method of claim 22, wherein said first egress module and  
2     said alternate egress module are predetermined, wherein identifiers associated with said  
3     first egress module and said alternate egress module are stored within a flow block  
4     associated with said flow, and wherein preventing comprises:  
5           storing an indication in said flow block that all sets of information associated with  
6     said flow are not to be sent to said first egress module.

1           24.     (Previously Presented) The method of claim 21, wherein said first set of  
2     information and said future set of information are both part of a flow, and wherein said  
3     method further comprises:  
4           in response to said message, causing other sets of information associated with said  
5     flow to be sent from said ingress module to said alternate egress module.

1           25.     (Original) The method of claim 24, wherein said first egress module and  
2     said alternate egress module are predetermined, wherein identifiers associated with said

3 first egress module and said alternate egress module are stored within a flow block  
4 associated with said flow, and wherein causing comprises:  
5 storing an indication in said flow block that all sets of information associated with  
6 said flow are to be sent to said alternate egress module.

1 26. (Original) The method of claim 21, wherein said first set of information  
2 and said future set of information are both part of a flow, wherein said first egress module  
3 and said alternate egress module are predetermined, wherein identifiers associated with  
4 said first egress module and said alternate egress module are stored within a flow block  
5 associated with said flow, and wherein selecting said alternate egress module comprises:  
6 accessing said flow block to access the identifier associated with said alternate  
7 egress module.

1 27. (Original) The method of claim 21, wherein said first set of information  
2 comprises a data portion, and wherein said method further comprises:  
3 in response to said message, resending at least said data portion of said first set of  
4 information from said ingress module to said alternate egress module for forwarding to  
5 said destination.

1 28. (Original) The method of claim 27, wherein said message comprises said  
2 data portion such that said data portion is returned to said ingress module.

1 29. Canceled

1           30.     (Previously Presented) The method of claim 21, wherein identifying said  
2 ingress module comprises:  
3           extracting from said first set of information an identifier which identifies said  
4 ingress module.

1           31.     (Original) The method of claim 21, wherein said ingress module  
2 comprises an ingress line card, said first egress module comprises a first egress line card,  
3 and said alternate egress module comprises a second egress line card.

1           32.     (Original) The method of claim 21, wherein said method is implemented  
2 on a routing layer of said network.

1           33.     (Currently Amended) A method, implemented within a router of a  
2 network, for recovering from a failure, comprising:  
3           sending, via a first route, a first set of information from an ingress module to a  
4 first egress module for forwarding by said first egress module to a destination external to  
5 said router;  
6           detecting an external failure beyond said first egress module;  
7           in response to said external failure, directing a message to said ingress module  
8 informing said ingress module of said external failure;  
9           in response to said message, selecting an alternate egress module capable of  
10 forwarding information to said destination; and

11            sending, via a second route, a future set of information from said ingress module  
12            to said alternate egress module for forwarding to said destination;  
13            wherein directing said message to said ingress module comprises:  
14                   identifying said ingress module;  
15                   accessing a routing table which comprises one or more routes to said  
16                   ingress module;  
17                   obtaining a return route from said routing table, wherein said return route  
18                   is different from said first route; and  
19                   sending said message to said ingress module via said return route.

1            34.     (Original) The method of claim 33, wherein said first set of information  
2            and said future set of information are both part of a flow, and wherein said method  
3            further comprises:  
4                   in response to said message, preventing other sets of information associated with  
5            said flow from being sent from said ingress module to said first egress module.

1            35.     (Original) The method of claim 34, wherein said first egress module and  
2            said alternate egress module are predetermined, wherein identifiers associated with said  
3            first egress module and said alternate egress module are stored within a flow block  
4            associated with said flow, and wherein preventing comprises:  
5                   storing an indication in said flow block that all sets of information associated with  
6            said flow are not to be sent to said first egress module.

1           36.     (Previously Presented) The method of claim 33, wherein said first set of  
2     information and said future set of information are both part of a flow, and wherein said  
3     method further comprises:  
4           in response to said message, causing other sets of information associated with said  
5     flow to be sent from said ingress module to said alternate egress module.

1           37.     (Original) The method of claim 36, wherein said first egress module and  
2     said alternate egress module are predetermined, wherein identifiers associated with said  
3     first egress module and said alternate egress module are stored within a flow block  
4     associated with said flow, and wherein causing comprises:  
5           storing an indication in said flow block that all sets of information associated with  
6     said flow are to be sent to said alternate egress module.

1           38.     (Original) The method of claim 33, wherein said first set of information  
2     and said future set of information are both part of a flow, wherein said first egress module  
3     and said alternate egress module are predetermined, wherein identifiers associated with  
4     said first egress module and said alternate egress module are stored within a flow block  
5     associated with said flow, and wherein selecting said alternate egress module comprises:  
6           accessing said flow block to access the identifier associated with said alternate  
7     egress module.

1           39.     (Original) The method of claim 33, wherein said first set of information  
2     comprises a data portion, and wherein said method further comprises:

3           in response to said message, resending at least said data portion of said first set of  
4   information from said ingress module to said alternate egress module for forwarding to  
5   said destination.

1           40.   (Original) The method of claim 39, wherein said message comprises said  
2   data portion such that said data portion is returned to said ingress module.

1           41.   Canceled

1           42.   (Previously Presented) The method of claim 33, wherein identifying said  
2   ingress module comprises:  
3           extracting from said first set of information an identifier which identifies said  
4   ingress module.

1           43.   (Original) The method of claim 33, wherein said ingress module  
2   comprises an ingress line card, said first egress module comprises a first egress line card,  
3   and said alternate egress module comprises a second egress line card.

1           44.   (Original) The method of claim 33, wherein said method is implemented  
2   on a routing layer of said network.

1           45.     (Original) The method of claim 33, wherein said external failure  
2 precludes said first egress module from forwarding said first set of information to said  
3 destination.

1           46.     (Currently Amended) A router, comprising:  
2 an ingress module;  
3 an egress module; and  
4 a forwarding mechanism for forwarding information between said ingress module  
5 and said egress module;

6 wherein said ingress module sends a first set of information to said forwarding  
7 mechanism to be forwarded to said egress module via a first route, said forwarding  
8 mechanism detecting a failure in said first route, and in response to said failure, said  
9 forwarding mechanism directing a message to said ingress module informing said ingress  
10 module of said failure, and in response to said message, said ingress module sending a  
11 future set of information to said forwarding mechanism to be forwarded to said egress  
12 module via an alternate route;

13 wherein said forwarding mechanism directs said message to said ingress module  
14 by:

15 identifying said ingress module;

16 accessing a routing table which comprises one or more routes to said

17 ingress module;

18 obtaining a return route from said routing table, wherein said return route

19 is different from said first route; and

20                    sending said message to said ingress module via said return route.

1            47.    (Previously Presented) The router of claim 46, wherein said ingress  
2    module comprises a memory, and wherein said first route and said alternate route are  
3    predetermined and stored within a second routing table in said memory.

1            48.    (Previously Presented) The router of claim 47, wherein said ingress  
2    module selects said alternate route from said second routing table.

1            49.    (Original) The router of claim 46, wherein said ingress module, in  
2    response to said message, prevents other sets of information from being sent from said  
3    ingress module to said egress module via said first route.

1            50.    (Previously Presented) The router of claim 49, wherein said ingress  
2    module comprises a memory, wherein said first route and said alternate route are  
3    predetermined and stored within a second routing table in said memory, and wherein said  
4    ingress module prevents other sets of information from being sent from said ingress  
5    module to said egress module via said first route by replacing said first route with said  
6    alternate route in said second routing table.

1            51.    (Original) The router of claim 46, wherein said first set of information  
2    comprises a data portion, and wherein said ingress module, in response to said message,

3 resends at least said data portion of said first set of information to said forwarding  
4 mechanism to be forwarded to said egress module via said alternate route.

1 52. (Original) The router of claim 51, wherein said forwarding mechanism  
2 includes said data portion in said message such that said data portion is returned by said  
3 forwarding mechanism to said ingress module.

1 53. Canceled

1 54. (Previously Presented) The router of claim 46, wherein said forwarding  
2 mechanism identifies said ingress module by extracting from said first set of information  
3 an identifier which identifies said ingress module.

1 55. (Original) The router of claim 46, wherein said ingress module comprises  
2 an ingress line card, said egress module comprises an egress line card, and said  
3 forwarding mechanism comprises a switching fabric.

1 56. (Original) The router of claim 55, wherein said switching fabric  
2 comprises a fabric card.

1 57. (Currently Amended) A router, comprising:  
2 an ingress module;  
3 a first egress module;

4           an alternate egress module; and  
5           a forwarding mechanism for forwarding information between said ingress  
6 module, said first egress module, and said alternate egress module;  
7           wherein said ingress module sends a first set of information to said forwarding  
8 mechanism to be forwarded to said first egress module via a first route, said first set of  
9 information intended to be forwarded by said first egress module to a destination external  
10 to said router, said forwarding mechanism detecting a failure which precludes forwarding  
11 of said first set of information to said first egress module, and in response to said failure,  
12 said forwarding mechanism directing a message to said ingress module informing said  
13 ingress module of said failure, and based upon said message, said ingress module  
14 determining that said first egress module has failed, and in response to said message, said  
15 ingress module selecting said alternate egress module and sending a future set of  
16 information to said forwarding mechanism to be forwarded to said alternate egress  
17 module, said future set of information intended to be forwarded by said alternate egress  
18 module to said destination;  
19           wherein said forwarding mechanism directs said message to said ingress module  
20 by:  
21                 identifying said ingress module;  
22                 accessing a routing table which comprises one or more routes to said  
23                         ingress module;  
24                 obtaining a return route from said routing table, wherein said return route  
25                         is different from said first route; and  
26                 sending said message to said ingress module via said return route.

1           58.     (Original) The router of claim 57, wherein said first set of information  
2     and said future set of information are both part of a flow, and wherein said ingress  
3     module, in response to said message, prevents other sets of information associated with  
4     said flow from being sent from said ingress module to said first egress module.

1           59.     (Original) The router of claim 58, wherein said first egress module and  
2     said alternate egress module are predetermined, wherein said ingress module comprises a  
3     memory, wherein identifiers associated with said first egress module and said alternate  
4     egress module are stored within a flow block associated with said flow, said flow block  
5     being stored in said memory, and wherein said ingress module prevents other sets of  
6     information associated with said flow from being sent from said ingress module to said  
7     first egress module by storing an indication in said flow block that all sets of information  
8     associated with said flow are not to be sent to said first egress module.

1           60.     (Previously Presented) The router of claim 57, wherein said first set of  
2     information and said future set of information are both part of a flow, and wherein said  
3     ingress module, in response to said message, causes other sets of information associated  
4     with said flow to be sent from said ingress module to said alternate egress module via  
5     said forwarding mechanism.

1           61.     (Previously Presented) The router of claim 60, wherein said first egress  
2     module and said alternate egress module are predetermined, wherein said ingress module

3 comprises a memory, wherein identifiers associated with said first egress module and  
4 said alternate egress module are stored within a flow block associated with said flow, said  
5 flow block being stored in said memory, and wherein said ingress module causes other  
6 sets of information associated with said flow to be sent from said ingress module to said  
7 alternate egress module by storing an indication in said flow block that all sets of  
8 information associated with said flow are to be sent to said alternate egress module.

1           62.     (Original) The router of claim 57, wherein said first set of information  
2 and said future set of information are both part of a flow, wherein said first egress module  
3 and said alternate egress module are predetermined, wherein said ingress module  
4 comprises a memory, wherein identifiers associated with said first egress module and  
5 said alternate egress module are stored within a flow block associated with said flow, said  
6 flow block being stored in said memory, and wherein said ingress module selects said  
7 alternate egress module by accessing said flow block to access the identifier associated  
8 with said alternate egress module.

1           63.     (Original) The router of claim 57, wherein said first set of information  
2 comprises a data portion, and wherein said ingress module, in response to said message,  
3 resends at least said data portion of said first set of information to said forwarding  
4 mechanism to be forwarded to said alternate egress module for forwarding to said  
5 destination.

1           64.     (Original) The router of claim 63, wherein said forwarding mechanism  
2 includes said data portion in said message such that said data portion is returned by said  
3 forwarding mechanism to said ingress module.

1           65.     Canceled

1           66.     (Previously Presented) The router of claim 57, wherein said forwarding  
2 mechanism identifies said ingress module by extracting from said first set of information  
3 an identifier which identifies said ingress module.

1           67.     (Original) The router of claim 57, wherein said ingress module comprises  
2 an ingress line card, said first egress module comprises a first egress line card, said  
3 alternate egress module comprises a second egress line card, and said forwarding  
4 mechanism comprises a switching fabric.

1           68.     (Original) The router of claim 67, wherein said switching fabric  
2 comprises a fabric card.

1           69.     (Currently Amended) A router, comprising:  
2 an ingress module;  
3 a first egress module;  
4 an alternate egress module; and

5 a forwarding mechanism for forwarding information between said ingress  
6 module, said first egress module, and said alternate egress module;  
7 wherein said ingress module sends a first set of information to said forwarding  
8 mechanism to be forwarded to said first egress module via a first route, said first set of  
9 information intended to be forwarded by said first egress module to a destination external  
10 to said router, said first egress module detecting an external failure which precludes said  
11 first egress module from forwarding said first set of information to said destination, and  
12 in response to said external failure, said first egress module directing a message to said  
13 ingress module informing said ingress module of said external failure, and in response to  
14 said message, said ingress module selecting said alternate egress module and sending a  
15 future set of information to said forwarding mechanism to be forwarded to said alternate  
16 egress module, said future set of information intended to be forwarded by said alternate  
17 egress module to said destination;  
18 wherein said first egress module directs said message to said ingress module by:  
19 identifying said ingress module;  
20 accessing a routing table which comprises one or more routes to said  
21 ingress module;  
22 obtaining a return route from said routing table, wherein said return route  
23 is different from said first route; and  
24 sending said message to said ingress module via said return route.

1 70. (Original) The router of claim 69, wherein said first set of information  
2 and said future set of information are both part of a flow, and wherein said ingress

3 module, in response to said message, prevents other sets of information associated with  
4 said flow from being sent from said ingress module to said first egress module.

1 71. (Original) The router of claim 70, wherein said first egress module and  
2 said alternate egress module are predetermined, wherein said ingress module comprises a  
3 memory, wherein identifiers associated with said first egress module and said alternate  
4 egress module are stored within a flow block associated with said flow, said flow block  
5 being stored in said memory, and wherein said ingress module prevents other sets of  
6 information associated with said flow from being sent from said ingress module to said  
7 first egress module by storing an indication in said flow block that all sets of information  
8 associated with said flow are not to be sent to said first egress module.

1 72. (Previously Presented) The router of claim 69, wherein said first set of  
2 information and said future set of information are both part of a flow, and wherein said  
3 ingress module, in response to said message, causes other sets of information associated  
4 with said flow to be sent from said ingress module to said alternate egress module via  
5 said forwarding mechanism.

1 73. (Previously Presented) The router of claim 72, wherein said first egress  
2 module and said alternate egress module are predetermined, wherein said ingress module  
3 comprises a memory, wherein identifiers associated with said first egress module and  
4 said alternate egress module are stored within a flow block associated with said flow, said  
5 flow block being stored in said memory, and wherein said ingress module causes other

6 sets of information associated with said flow to be sent from said ingress module to said  
7 alternate egress module by storing an indication in said flow block that all sets of  
8 information associated with said flow are to be sent to said alternate egress module.

1           74.     (Original) The router of claim 69, wherein said first set of information  
2 and said future set of information are both part of a flow, wherein said first egress module  
3 and said alternate egress module are predetermined, wherein said ingress module  
4 comprises a memory, wherein identifiers associated with said first egress module and  
5 said alternate egress module are stored within a flow block associated with said flow, said  
6 flow block being stored in said memory, and wherein said ingress module selects said  
7 alternate egress module by accessing said flow block to access the identifier associated  
8 with said alternate egress module.

1           75.     (Original) The router of claim 69, wherein said first set of information  
2 comprises a data portion, and wherein said ingress module, in response to said message,  
3 resends at least said data portion of said first set of information to said forwarding  
4 mechanism to be forwarded to said alternate egress module for forwarding to said  
5 destination.

1           76.     (Original) The router of claim 75, wherein said first egress module  
2 includes said data portion in said message such that said data portion is returned by said  
3 first egress module to said ingress module.

1           77.     Canceled

1           78.     (Previously Presented) The router of claim 69, wherein said first egress  
2     module identifies said ingress module by extracting from said first set of information an  
3     identifier which identifies said ingress module.

1           79.     (Original) The router of claim 69, wherein said ingress module comprises  
2     an ingress line card, said first egress module comprises a first egress line card, said  
3     alternate egress module comprises a second egress line card, and said forwarding  
4     mechanism comprises a switching fabric.

1           80.     (Original) The router of claim 79, wherein said switching fabric  
2     comprises a fabric card.

1           81.     (Currently Amended) A method implemented by a forwarding  
2     mechanism in a router, comprising:  
3             receiving a set of information sent by an ingress module intended to be forwarded  
4             to an egress module via a particular route;  
5             detecting a failure in said particular route; and  
6             in response to said failure, directing a message to said ingress module informing  
7     said ingress module of said failure;  
8             wherein directing said message to said ingress module comprises:  
9             identifying said ingress module;

10                   accessing a routing table which comprises one or more routes to said  
11                   ingress module;  
12                   obtaining a return route from said routing table, wherein said return route  
13                   is different from said particular route; and  
14                   sending said message to said ingress module via said return route.

1           82.    (Original) The method of claim 81, wherein said set of information  
2   comprises a data portion, and wherein directing said message to said ingress module  
3   comprises:  
4           returning said data portion to said ingress module.

1           83.    (Original) The method of claim 81, wherein said set of information  
2   comprises a data portion, and wherein directing said message to said ingress module  
3   comprises:  
4           including said data portion in said message such that said data portion is returned  
5   to said ingress module.

1           84.    Canceled

1           85.    (Previously Presented) The method of claim 81, wherein identifying said  
2   ingress module comprises:  
3           extracting from said first set of information an identifier which identifies said  
4   ingress module.

1           86.     Canceled

1           87.     (Currently Amended) A forwarding mechanism in a router, comprising:

2           a mechanism for receiving a set of information sent by an ingress module

3     intended to be forwarded to an egress module via a particular route;

4           a mechanism for detecting a failure in said particular route; and

5           a mechanism for directing, in response to said failure, a message to said ingress

6     module informing said ingress module of said failure;

7           wherein said forwarding mechanism further comprises a memory for storing a

8     routing table which comprises one or more routes to said ingress module, and wherein the

9     mechanism for directing said message to said ingress module comprises:

10           a mechanism for identifying said ingress module;

11           a mechanism for accessing said routing table;

12           a mechanism for obtaining a return route from said routing table, wherein

13                   said return route is different from said first route; and

14           a mechanism for sending said message to said ingress module via said

15           return route.

1           88.     (Original) The forwarding mechanism of claim 87, wherein said set of

2     information comprises a data portion, and wherein the mechanism for directing said

3     message to said ingress module comprises:

4           a mechanism for returning said data portion to said ingress module.

1           89.     (Original) The forwarding mechanism of claim 87, wherein said set of  
2     information comprises a data portion, and wherein the mechanism for directing said  
3     message to said ingress module comprises:  
4           a mechanism for including said data portion in said message such that said data  
5     portion is returned to said ingress module.

1           90.     Canceled

1           91.     (Previously Presented) The forwarding mechanism of claim 87, wherein  
2     the mechanism for identifying said ingress module comprises:  
3           a mechanism for extracting from said first set of information an identifier which  
4     identifies said ingress module.

1           92.     Canceled

1           93.     (Currently Amended) A method implemented by an egress module in a  
2     router, comprising:  
3           receiving, via a particular route, a set of information sent by an ingress module  
4     intended to be forwarded by the egress module to a destination external to the router;  
5           detecting a failure external to the router which precludes the egress module from  
6     forwarding said set of information to said destination; and

7 in response to said failure, directing a message to said ingress module informing  
8 said ingress module of said failure;

9 wherein directing said message to said ingress module comprises:

10 identifying said ingress module;

11 accessing a routing table which comprises one or more routes to said  
12 ingress module;

13 obtaining a return route from said routing table, wherein said return route  
14 is different from said particular route; and

15 sending said message to said ingress module via said return route.  
16

1 94. (Original) The method of claim 93, wherein said set of information  
2 comprises a data portion, and wherein directing said message to said ingress module  
3 comprises:  
4 returning said data portion to said ingress module.

1 95. (Original) The method of claim 93, wherein said set of information  
2 comprises a data portion, and wherein directing said message to said ingress module  
3 comprises:  
4 including said data portion in said message such that said data portion is returned  
5 to said ingress module.

1 96. Canceled

1           97.     (Previously Presented) The method of claim 93, wherein identifying said  
2     ingress module comprises:  
3           extracting from said first set of information an identifier which identifies said  
4     ingress module.

1           98.     Canceled

1           99.     (Currently Amended) An egress module in a router, comprising:  
2           a mechanism for receiving, via a particular route, a set of information sent by an  
3     ingress module intended to be forwarded by said egress module to a destination external  
4     to the router;  
5           a mechanism for detecting a failure external to the router which precludes said  
6     egress module from forwarding said set of information to said destination; and  
7           a mechanism for directing, in response to said failure, a message to said ingress  
8     module informing said ingress module of said failure;  
9           wherein said egress module further comprises a memory for storing a routing  
10    table which comprises one or more routes to said ingress module, and wherein the  
11    mechanism for directing said message to said ingress module comprises:  
12           a mechanism for identifying said ingress module;  
13           a mechanism for accessing said routing table;  
14           a mechanism for obtaining a return route from said routing table, wherein  
15           said return route is different from said particular route; and

16                   a mechanism for sending said message to said ingress module via said  
17                   return route.

1           100.   (Original) The egress module of claim 99, wherein said set of information  
2   comprises a data portion, and wherein the mechanism for directing said message to said  
3   ingress module comprises:  
4           a mechanism for returning said data portion to said ingress module.

1           101.   (Original) The egress module of claim 99, wherein said set of information  
2   comprises a data portion, and wherein the mechanism for directing said message to said  
3   ingress module comprises:  
4           a mechanism for including said data portion in said message such that said data  
5   portion is returned to said ingress module.

1           102.   Canceled

1           103.   (Previously Presented) The egress module of claim 99, wherein the  
2   mechanism for identifying said ingress module comprises:  
3           a mechanism for extracting from said first set of information an identifier which  
4   identifies said ingress module.

1           104-136.   Canceled

1           137. (Previously Presented) A method, implemented within a router of a  
2 network, for recovering from a failure, comprising:  
3           sending a first set of information from an ingress module to a first egress module  
4 for forwarding by said first egress module to a destination external to said router;  
5           detecting a failure of said first egress module;  
6           in response to said failure of said first egress module, directing a message to said  
7 ingress module informing said ingress module of said first egress module failure;  
8           in response to said message, selecting an alternate egress module capable of  
9 forwarding information to said destination; and  
10          sending a future set of information from said ingress module to said alternate  
11 egress module for forwarding to said destination;  
12          wherein said first set of information and said future set of information are both  
13 part of a flow, wherein said first egress module and said alternate egress module are  
14 predetermined, wherein identifiers associated with said first egress module and said  
15 alternate egress module are stored within a flow block associated with said flow, and  
16 wherein selecting said alternate egress module comprises:  
17          accessing said flow block to access the identifier associated with said alternate  
18 egress module.

1           138. (Previously Presented) The method of claim 137, further comprising:  
2           in response to said message, preventing other sets of information associated with  
3 said flow from being sent from said ingress module to said first egress module by storing

4 an indication in said flow block that all sets of information associated with said flow are  
5 not to be sent to said first egress module.

1 139. (Previously Presented) The method of claim 137, further comprising:  
2 in response to said message, causing other sets of information associated with said  
3 flow to be sent from said ingress module to said alternate egress module by storing an  
4 indication in said flow block that all sets of information associated with said flow are to  
5 be sent to said alternate egress module.

1 140. (Previously Presented) A method, implemented within a router of a  
2 network, for recovering from a failure, comprising:  
3 sending a first set of information from an ingress module to a first egress module  
4 for forwarding by said first egress module to a destination external to said router;  
5 detecting an external failure beyond said first egress module;  
6 in response to said external failure, directing a message to said ingress module  
7 informing said ingress module of said external failure;  
8 in response to said message, selecting an alternate egress module capable of  
9 forwarding information to said destination; and  
10 sending a future set of information from said ingress module to said alternate  
11 egress module for forwarding to said destination;  
12 wherein said first set of information and said future set of information are both  
13 part of a flow, wherein said first egress module and said alternate egress module are  
14 predetermined, wherein identifiers associated with said first egress module and said

15 alternate egress module are stored within a flow block associated with said flow, and  
16 wherein selecting said alternate egress module comprises:  
17       accessing said flow block to access the identifier associated with said alternate  
18 egress module.

1       141. (Previously Presented) The method of claim 140, further comprising:  
2       in response to said message, preventing other sets of information associated with  
3 said flow from being sent from said ingress module to said first egress module by storing  
4 an indication in said flow block that all sets of information associated with said flow are  
5 not to be sent to said first egress module.

1       142. (Previously Presented) The method of claim 140, further comprising:  
2       in response to said message, causing other sets of information associated with said  
3 flow to be sent from said ingress module to said alternate egress module by storing an  
4 indication in said flow block that all sets of information associated with said flow are to  
5 be sent to said alternate egress module.

1       143. (Previously Presented) A router, comprising:  
2       an ingress module;  
3       a first egress module;  
4       an alternate egress module; and  
5       a forwarding mechanism for forwarding information between said ingress  
6 module, said first egress module, and said alternate egress module;

7 wherein said ingress module sends a first set of information to said forwarding  
8 mechanism to be forwarded to said first egress module, said first set of information  
9 intended to be forwarded by said first egress module to a destination external to said  
10 router, said forwarding mechanism detecting a failure which precludes forwarding of said  
11 first set of information to said first egress module, and in response to said failure, said  
12 forwarding mechanism directing a message to said ingress module informing said ingress  
13 module of said failure, and based upon said message, said ingress module determining  
14 that said first egress module has failed, and in response to said message, said ingress  
15 module selecting said alternate egress module and sending a future set of information to  
16 said forwarding mechanism to be forwarded to said alternate egress module, said future  
17 set of information intended to be forwarded by said alternate egress module to said  
18 destination;

19 wherein said first set of information and said future set of information are both  
20 part of a flow, wherein said first egress module and said alternate egress module are  
21 predetermined, wherein said ingress module comprises a memory, wherein identifiers  
22 associated with said first egress module and said alternate egress module are stored  
23 within a flow block associated with said flow, said flow block being stored in said  
24 memory, and wherein said ingress module selects said alternate egress module by  
25 accessing said flow block to access the identifier associated with said alternate egress  
26 module.

1 144. (Previously Presented) The router of claim 143, wherein said ingress  
2 module, in response to said message, prevents other sets of information associated with

3 said flow from being sent from said ingress module to said first egress module by storing  
4 an indication in said flow block that all sets of information associated with said flow are  
5 not to be sent to said first egress module.

1 145. (Previously Presented) The router of claim 143, wherein said ingress  
2 module, in response to said message, causes other sets of information associated with  
3 said flow to be sent from said ingress module to said alternate egress module by storing  
4 an indication in said flow block that all sets of information associated with said flow are  
5 to be sent to said alternate egress module.

1 146. (Previously Presented) A router, comprising:  
2 an ingress module;  
3 a first egress module;  
4 an alternate egress module; and  
5 a forwarding mechanism for forwarding information between said ingress  
6 module, said first egress module, and said alternate egress module;  
7 wherein said ingress module sends a first set of information to said forwarding  
8 mechanism to be forwarded to said first egress module, said first set of information  
9 intended to be forwarded by said first egress module to a destination external to said  
10 router, said first egress module detecting an external failure which precludes said first  
11 egress module from forwarding said first set of information to said destination, and in  
12 response to said external failure, said first egress module directing a message to said  
13 ingress module informing said ingress module of said external failure, and in response to

14 said message, said ingress module selecting said alternate egress module and sending a  
15 future set of information to said forwarding mechanism to be forwarded to said alternate  
16 egress module, said future set of information intended to be forwarded by said alternate  
17 egress module to said destination;

18 wherein said first set of information and said future set of information are both  
19 part of a flow, wherein said first egress module and said alternate egress module are  
20 predetermined, wherein said ingress module comprises a memory, wherein identifiers  
21 associated with said first egress module and said alternate egress module are stored  
22 within a flow block associated with said flow, said flow block being stored in said  
23 memory, and wherein said ingress module selects said alternate egress module by  
24 accessing said flow block to access the identifier associated with said alternate egress  
25 module.

1 147. (Previously Presented) The router of claim 146, wherein said ingress  
2 module, in response to said message, prevents other sets of information associated with  
3 said flow from being sent from said ingress module to said first egress module by storing  
4 an indication in said flow block that all sets of information associated with said flow are  
5 not to be sent to said first egress module.

1 148. (Previously Presented) The router of claim 146, wherein said ingress  
2 module, in response to said message, causes other sets of information associated with  
3 said flow to be sent from said ingress module to said alternate egress module by storing

4 an indication in said flow block that all sets of information associated with said flow are  
5 to be sent to said alternate egress module.

1 149. (Previously Presented) A method implemented by an ingress module in a  
2 router, comprising:

3 sending a first set of information to a first egress module, said first set of  
4 information intended to be forwarded by the first egress module to a destination external  
5 to the router;

6 receiving a message indicating that said first set of information did not reach the  
7 destination successfully;

8 determining based upon said message whether future sets of information should  
9 be sent to the first egress module;

10 in response to a determination that future sets of information should not be sent to  
11 the first egress module, selecting an alternate egress module capable of forwarding  
12 information to the destination; and

13 sending a future set of information to the alternate egress module to be forwarded  
14 by the alternate egress module to the destination;

15 wherein said first set of information and said future set of information are both  
16 part of a flow, wherein said first egress module and said alternate egress module are  
17 predetermined, wherein identifiers associated with said first egress module and said  
18 alternate egress module are stored within a flow block associated with said flow, and  
19 wherein selecting the alternate egress module comprises:

20           accessing said flow block to access the identifier associated with the alternate  
21   egress module.

1           150.   (Previously Presented) The method of claim 149, further comprising:  
2           in response to a determination that future sets of information should not be sent to  
3   the first egress module, preventing other sets of information associated with said flow  
4   from being sent to the first egress module by storing an indication in said flow block that  
5   all sets of information associated with said flow are not to be sent to the first egress  
6   module.

1           151.   (Previously Presented) The method of claim 149, further comprising:  
2           in response to a determination that future sets of information should not be sent to  
3   the first egress module, causing other sets of information associated with said flow to be  
4   sent to the alternate egress module by storing an indication in said flow block that all sets  
5   of information associated with said flow are to be sent to the alternate egress module.

1           152.   (Previously Presented) An ingress module in a router, comprising:  
2           a mechanism for sending a first set of information to a first egress module, said  
3   first set of information intended to be forwarded by the first egress module to a  
4   destination external to the router;  
5           a mechanism for receiving a message indicating that said first set of information  
6   did not reach the destination successfully;

7           a mechanism for determining based upon said message whether future sets of  
8   information should be sent to the first egress module;  
9           a mechanism for selecting, in response to a determination that future sets of  
10   information should not be sent to the first egress module, an alternate egress module  
11   capable of forwarding information to the destination; and  
12           a mechanism for sending a future set of information to the alternate egress module  
13   to be forwarded by the alternate egress module to the destination;  
14           wherein said ingress module comprises a memory, wherein said first set of  
15   information and said future set of information are both part of a flow, wherein the first  
16   egress module and the alternate egress module are predetermined, wherein identifiers  
17   associated with the first egress module and the alternate egress module are stored within a  
18   flow block associated with said flow, said flow block being stored in said memory, and  
19   wherein the mechanism for selecting the alternate egress module comprises:  
20           a mechanism for accessing said flow block to access the identifier associated with  
21   the alternate egress module.

1           153.   (Previously Presented) The ingress module of claim 152, further  
2   comprising:  
3           a mechanism for preventing, in response to a determination that future sets of  
4   information should not be sent to the first egress module, other sets of information  
5   associated with said flow from being sent to the first egress module, the mechanism for  
6   preventing comprising a mechanism for storing an indication in said flow block that all  
7   sets of information associated with said flow are not to be sent to the first egress module.

1           154. (Previously Presented) The ingress module of claim 152, further  
2 comprising:  
3           a mechanism for causing, in response to a determination that future sets of  
4 information should not be sent to the first egress module, other sets of information  
5 associated with said flow to be sent to the alternate egress module, the mechanism for  
6 causing comprising a mechanism for storing an indication in said flow block that all sets  
7 of information associated with said flow are to be sent to the alternate egress module.  
8

1           155-160       Canceled

1           161. (Currently Amended) In a router comprising an ingress module, a first  
2 egress module, and an alternate egress module, a method implemented by the ingress  
3 module, comprising:  
4           sending a first set of information to the first egress module, said first set of  
5 information intended to be forwarded by the first egress module to a destination external  
6 to the router;  
7           receiving a message indicating that the first egress module failed;  
8           in response to said message, selecting the alternate egress module, which is  
9 capable of forwarding information to the destination; and  
10          sending a future set of information to the alternate egress module to be forwarded  
11 by the alternate egress module to the destination;

12        wherein said first set of information and said future set of information are both  
 13   part of a flow, wherein the first egress module and the alternate egress module are  
 14   predetermined, wherein identifiers associated with the first egress module and the  
 15   alternate egress module are stored within a flow block associated with said flow, and  
 16   wherein selecting the alternate egress module comprises:  
 17        accessing said flow block to access the identifier associated with the alternate  
 18   egress module.

1        162. (Currently Amended) The method of claim 161, ~~wherein said first set of~~  
 2   ~~information and said future set of information are both part of a flow, and wherein said~~  
 3   ~~method further comprises~~ further comprising:  
 4        preventing other sets of information associated with said flow from being sent to  
 5   the first egress module.

1        163. (Currently Amended) The method of claim 162, ~~wherein the first egress~~  
 2   ~~module and the alternate egress module are predetermined, wherein identifiers associated~~  
 3   ~~with the first egress module and the alternate egress module are stored within a flow~~  
 4   ~~block associated with said flow, and wherein preventing comprises:~~  
 5        storing an indication in said flow block that all sets of information associated with  
 6   said flow are not to be sent to the first egress module.

1           164. (Currently Amended) The method of claim 161, ~~wherein said first set of~~  
2 ~~information and said future set of information are both part of a flow, and wherein said~~  
3 ~~method further comprises~~ further comprising:

4           causing other sets of information associated with said flow to be sent to the  
5 alternate egress module.

1           165. (Currently Amended) The method of claim 164, ~~wherein the first egress~~  
2 ~~module and the alternate egress module are predetermined, wherein identifiers associated~~  
3 ~~with the first egress module and the alternate egress module are stored within a flow~~  
4 ~~block associated with said flow, and~~ wherein causing comprises:

5           storing an indication in said flow block that all sets of information associated with  
6 said flow are to be sent to the alternate egress module.

1           166. Canceled

1           167. (Previously Presented) The method of claim 161, wherein said first set of  
2 information comprises a data portion, and wherein said method further comprises:

3           resending at least said data portion of said first set of information to the alternate  
4 egress module to be forwarded by the alternate egress module to the destination.

1           168. (Previously Presented) The method of claim 167, wherein said message  
2 indicating that the first egress module failed comprises said data portion of said first set  
3 of information.

1           169-174.       Canceled

1           175.   (Currently Amended) In a router comprising a first egress module and an  
2 alternate egress module, an ingress module, comprising:

3           a mechanism for sending a first set of information to the first egress module, said  
4 first set of information intended to be forwarded by the first egress module to a  
5 destination external to the router;

6           a mechanism for receiving a message indicating that the first egress module  
7 failed;

8           a mechanism for selecting, in response to said message, the alternate egress  
9 module, which is capable of forwarding information to the destination; and

10          a mechanism for sending a future set of information to the alternate egress module  
11 to be forwarded by the alternate egress module to the destination;

12          wherein said first set of information and said future set of information are both  
13 part of a flow, wherein the first egress module and the alternate egress module are  
14 predetermined, wherein identifiers associated with the first egress module and the  
15 alternate egress module are stored within a flow block associated with said flow, and  
16 wherein the mechanism for selecting the alternate egress module comprises:

17          a mechanism for accessing said flow block to access the identifier associated with  
18 the alternate egress module.

1           176. (Currently Amended) The ingress module of claim 175, ~~wherein said first~~  
2 ~~set of information and said future set of information are both part of a flow, and wherein~~  
3 ~~said ingress module further comprises~~ further comprising:

4           a mechanism for preventing other sets of information associated with said flow  
5 from being sent to the first egress module.

1           177. (Currently Amended) The ingress module of claim 176, ~~wherein the first~~  
2 ~~egress module and the alternate egress module are predetermined, wherein identifiers~~  
3 ~~associated with the first egress module and the alternate egress module are stored within a~~  
4 ~~flow block associated with said flow, and wherein the mechanism for preventing~~  
5 comprises:

6           a mechanism for storing an indication in said flow block that all sets of  
7 information associated with said flow are not to be sent to the first egress module.

1           178. (Currently Amended) The ingress module of claim 175, ~~wherein said first~~  
2 ~~set of information and said future set of information are both part of a flow, and wherein~~  
3 ~~said ingress module further comprises~~ further comprising:

4           a mechanism for causing other sets of information associated with said flow to be  
5 sent to the alternate egress module.

1           179. (Currently Amended) The ingress module of claim 178, ~~wherein the first~~  
2 ~~egress module and the alternate egress module are predetermined, wherein identifiers~~

3 ~~associated with the first egress module and the alternate egress module are stored within a~~  
4 ~~flow block associated with said flow, and~~ wherein the mechanism for causing comprises:  
5 a mechanism for storing an indication in said flow block that all sets of  
6 information associated with said flow are to be sent to the alternate egress module.

1 180. Canceled

1 181. (Previously Presented) The ingress module of claim 175, wherein said  
2 first set of information comprises a data portion, and wherein said ingress module further  
3 comprises:  
4 a mechanism for resending at least said data portion of said first set of information  
5 to the alternate egress module to be forwarded by the alternate egress module to the  
6 destination.

1 182. (Previously Presented) The ingress module of claim 181, wherein said  
2 message indicating that the first egress module failed comprises said data portion of said  
3 first set of information.